

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1 and 3-6 are currently pending, Claim 1 having been amended, and Claim 2 having been canceled without prejudice or disclaimer. The changes and additions to the claims do not add new matter and are supported by the originally filed specification, for example, on original Claim 2.

In the outstanding Office Action, Claims 1-3 and 5 were rejected under 35 U.S.C. §102(b) as being anticipated by Cole et al. (U.S. Patent No. 5,617,862, hereafter “Cole”); Claims 1-2 were rejected under 35 U.S.C. §102(e) as being anticipated by Van Stalen et al. (U.S. Patent No. 6,967,975, hereafter “Van Stalen”); Claims 2, 4, and 5 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cole in view of Freeman et al. (U.S. Patent No. 6,208,189, hereafter “Freeman”); Claims 3-5 were rejected under 35 U.S.C. §103(a) as being unpatentable over Van Stalen in view of Freeman; Claim 6 was allowed.

Applicant thanks the examiner for the indication that Claim 6 is allowed.

With respect to the rejection of Claim 1 under 35 U.S.C. §102(b) as being anticipated by Cole, Applicant respectfully traverses this ground of rejection in part and submits that the present amendment to Claim 1 overcomes this ground of rejection. Amended Claim 1 recites, *inter alia*,

a plurality of channel modules responsive to ultrasound channel signals, and configured to produce a receive-focused beam, each of said plurality of channel modules including,

i) an analogue multiplexer configured to multiplex ultrasound signals originating from at least two ultrasound channels; and

ii) means coupled to the analogue multiplexer, for digitally processing and compensating said multiplexed ultrasound signal to produce a receive-focused beam.

Thus, Claim 1 is directed to providing a digital receive-focusing apparatus including a plurality of channel modules. Each of the channel modules has an analogue multiplexer configured to multiplex ultrasound signals originating from at least two ultrasound channels. Applicant submits that an advantage provided by this feature is that the hardware structure of the digital receive-focusing apparatus can be simplified.

Turning to the applied art, Cole is directed to a ultrasound beamformer system with a variable aperture. Fig. 2a of Cole shows the ultrasound beamformer system, which includes a receive multiplexer R-108 and a digital receive beamformer system R-100. Fig. 2b of Cole shows the digital receive beamformer system R-100, which further includes digital multi-channel receivers R101.

The Office Action takes the position that one or more of the digital multi-channel receivers R-101 disclosed in Cole corresponds to a “plurality of channel modules” of Claim 1. (See Office Action, at page 2). Further, the Office Action states that the receive multiplexer R-108 corresponds to the claimed “analogue multiplexer,” as previously recited in Claim 2. (See Office Action, at page 3).

However, the receive multiplexer R-108 of Cole is not an element belonging to the digital multi-channel receiver R-101 as shown in Figs. 2a-2b. In Cole, the receive multiplexer R-108 is used to route the input waveforms from the transducer elements T-114 to the receivers R-101 (see col. 6, lines 58-60). Each transducer element T-114 is connected separately to one of the plurality of digital multi-channel receivers R-101 through multiplexer R-108 (see col. 8, lines 23-25). The multiple-transducer multiplexer configuration shown in Fig. 2a permits selection of transmit and receive apertures lying entirely within a single transducer array or straddling across two transducer arrays (see column 11, lines 16-19). In other words, the receive multiplexer R-108 of Cole is not used to multiplex ultrasound signals

originating from at least two ultrasound channels in each of the plurality of the channel modules, as required in Claim 1, but rather it is used to select the receive aperture.

Thus, Cole fails to disclose or suggest at least “a plurality of channel modules responsive to ultrasound channel signals, and configured to produce a receive-focused beam, each of *said plurality of channel modules including, i) an analogue multiplexer configured to multiplex ultrasound signals originating from at least two ultrasound channels,*” as recited in amended Claim 1.

Applicant emphasizes that for anticipation, “**[t]he identical invention must be shown in as complete detail as is contained in the ... claim.**” See *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). (See also MPEP §2131).

Therefore, Applicant respectfully submits that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Cole.

With respect to the rejection of Claim 1 under 35 U.S.C. §102(e) as being anticipated by Van Stalen, Applicant respectfully traverses this ground of rejection in part and submits that the present amendment to Claim 1 overcomes this ground of rejection.

Van Stalen is directed to a method for time-domain multiplexed communication in ultrasound applications. Fig. 1 of Van Stalen shows an ultrasonic probe 110 and a ultrasonic data processing unit 130 which are connected to each other via a probe connector 120. The probe 110 also includes a time domain multiplexer 114.

The Office Action takes the position that the probe connector 120 and the ultrasonic data processing unit 130 of Van Stalen correspond to the “plurality of channel modules” of Claim 1. (See Office Action, at page 4). Further, the Office Action states that the time domain multiplexer 114 corresponds to the “analogue multiplexer” previously recited in Claim 2. (See Office Action, at page 4).

However, the time domain multiplexer 114 of Van Stalen is included in the probe 110, not in the probe connector 120 and the ultrasonic data processing unit 130, which were interpreted to correspond to the “plurality of channel modules” of Claim 1. As described in col. 4, lines 13-31 and shown in Fig. 2 of Van Stalen, the time domain multiplexer 114 is disposed between the array connector 113 and the probe connector 120. The number of outputs of the array connector 113 is greater than the number of outputs of the probe connector 120. The difference in the numbers of outputs between the array connector 113 and the probe connector 120 allows the probe connector 120 to be thinner and more flexible. In other words, the time domain multiplexer of Van Stalen is used to reduce the number of outputs of the array connector 113. However, the time domain multiplexer is not used for multiplexing ultrasound signals originating from at least two ultrasound channels in each of the plurality of the channel modules, as required in Claim 1.

Thus, Van Stalen fails to disclose or suggest at least “a plurality of channel modules responsive to ultrasound channel signals, and configured to produce a receive-focused beam, each of *said plurality of channel modules including, i) an analogue multiplexer configured to multiplex ultrasound signals originating from at least two ultrasound channels,*” as recited in amended Claim 1.

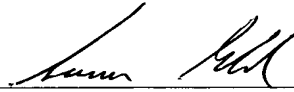
Therefore, Applicant respectfully submits that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Van Stalen.

Freeman has been considered, but fails to remedy the deficiencies of Cole or Van Stalen with regard to amended Claim 1 discussed above. Therefore, Applicant respectfully submits that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Cole, Van Stalen, or Freeman, either alone or in proper combination.

Consequently, in light of the above discussion and in view of the present amendment, the outstanding grounds for rejection are believed to have been overcome. The present application is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested. Furthermore, the examiner is kindly invited to contact the Applicants' undersigned representative at the phone number below to resolve any outstanding issues.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, L.L.P.



Bradley D. Lytle
Attorney of Record
Registration No. 40,073

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 07/09)

Sameer Gokhale
Registration No. 62,618